

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

REC'D 23 JUN 2005

PCT

To:  
DAVID A. SYROWIK  
BROOKS KUSHMAN  
1000 TOWN CENTER  
TWENTY-SECOND FLOOR  
SOUTHFIELD, MI 48075

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)

**21 JUN 2005**

Applicant's or agent's file reference

**FOR FURTHER ACTION**

See paragraph 2 below

UOM0324PCT

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US04/43152

22 December 2004 (22.12.2004)

23 December 2003 (23.12.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): B01F 5/00 and US Cl.: 366/336, 340

Applicant

THE REGENTS OF THE UNIVERSITY OF MICHIGAN

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Authorized officer

Tony G. Soohoo

Telephone No. 571-272-1700

Facsimile No. (703) 305-3230

Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US04/43152

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US04/43152

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>2-3, 5, 8, 11, 15, 18</u>	YES
	Claims <u>1, 4, 6-7, 9-10, 12-14, 16-17, 19-20</u>	NO
Inventive step (IS)	Claims _____	YES
	Claims <u>1-20</u>	NO
Industrial applicability (IA)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Claims 1, 4, 6-7, 9-10, 12-14, 16-17, 19-20 LACK novelty under PCT Article 33(2) as being anticipated by US 5,904,424 to SCHWESINGER et al.

The SCHWESINGER et al reference discloses the method and apparatus of the provision of flow micro-flow channels which split the flow and recombine the flow in a folded manner, see especially figures 1a-1b and 10.

Claims 1, 4, 6-7, 9-10, 12-14, 16-17, 19-20 LACK novelty under PCT Article 33(2) as being anticipated by US 6,190,034 to NIELSEN et al.

The NIELSEN reference discloses the method and apparatus of the provision of flow micro-flow channels which split the flow and recombine the flow in a folded manner, see column 1, lines 50 through column 5, line 50.

Claims 2-3, 5, 8, 11, 15 and 18 LACK an inventive step under PCT Article 33(3) as being obvious over US 5,904,424 to SCHWESINGER et al.

The SCHWESINGER et al reference discloses the method and apparatus of the provision of flow micro-flow channels which split the flow and recombine the flow in a folded manner, see especially figures 1a-1b and 10.

However does not discuss a provision of moving the paths to an offset opposite rotation or a helical fashion offset rotation. Whereas the reference discusses the splitting and recombining of the flow paths, an ordinary artisan would have found it obvious to configure the paths to differing configuration through ordinary experimentation so as to provide more optimal flow path arrangement. Thus an arrangement of opposite rotational paths and helical path patterns is deemed as lacking inventive step over the prior art.

Claims 2-3, 5, 8, 11, 15 and 18 LACK an inventive step under PCT Article 33(3) as being obvious over US 6,190,034 to NIELSEN et al.

The SCHWESINGER et al reference discloses the method and apparatus of the provision of flow micro-flow channels which split the flow and recombine the flow in a folded manner, see especially figures 1a-1b and 10.

However does not discuss a provision of moving the paths to an offset opposite rotation or a helical fashion offset rotation. Whereas the reference discusses the splitting and recombining of the flow paths, an ordinary artisan would have found it obvious to configure the paths to differing configuration through ordinary experimentation so as to provide more optimal flow path arrangement. Thus an arrangement of opposite rotational paths and helical path patterns is deemed as lacking inventive step over the prior art.

Claims 1-20 MEET the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference UOM0324PCT	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/US2004/043152	International filing date ( <i>day/month/year</i> ) 22 December 2004 (22.12.2004)	Priority date ( <i>day/month/year</i> ) 23 December 2003 (23.12.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant THE REGENTS OF THE UNIVERSITY OF MICHIGAN		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
  2. This REPORT consists of a total of 4 sheets, including this cover sheet.
- In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input checked="" type="checkbox"/> | Box No. III  | Non-establishment of opinion with regard to novelty; inventive step and industrial applicability  |
| <input checked="" type="checkbox"/> | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

<p style="text-align: center;">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 338 82 70</p>	<p>Date of issuance of this report 26 June 2006 (26.06.2006)</p> <p>Authorized officer  Masashi Honda</p> <p>e-mail: pt08@wipo.int</p>
--	--